

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings of claims in the application:

1-6. (Canceled)

7. (Withdrawn) A method for making an electrical component assembly, comprising, in sequence, the steps of:

laminating a film on an active surface of an semiconductor chip;

producing holes in the film to expose contact pads on the active surface of the semiconductor chip;

filling the holes with an electrically conductive material;

placing the semiconductor chip on a substrate with the film located between the semiconductor chip and the substrate; and

reflowing the electrically conductive material in order to attach the semiconductor chip to the substrate.

8. (Withdrawn) The method of claim 7 further comprising the step of: coating a surface of the film which faces the substrate with a flux adhesive.

9. (Withdrawn) The method of claim 7 wherein the filling step comprises filling the holes with molten solder.

10. (Withdrawn) The method of claim 7 wherein the filling step comprises filling the holes with solder paste.

11. (Withdrawn) The method of claim 7 wherein the holes are produced by laser drilling.

12. (Withdrawn) The method of claim 7 wherein the holes in the encapsulant are produced by plasma etching.

13. (Withdrawn) The method of claim 7 wherein the holes in the encapsulant are produced by chemical etching.

14. (Withdrawn) The method of claim 7 wherein the holes in the encapsulant are produced by photoimaging.

15-18. (Canceled)

19. (Withdrawn) A method for making an electrical component assembly, comprising, in sequence, the steps of:

laminating a film on one of a substrate having discrete solder bumps thereon or a semiconductor chip having an active surface thereon;

placing the semiconductor chip on the substrate with the film located between the semiconductor chip and the substrate; and

reflowing the solder bumps in order to attach the semiconductor chip to the substrate.

20. (Canceled)

21. (Currently amended) A method for making an electrical component assembly, comprising, in sequence, the steps of:

laminating a first portion encapsulant film on an active surface of a semiconductor chip having discrete solder bumps thereon;

coating one of the film or a substrate with a second portion encapsulant;

placing the semiconductor chip on the substrate with the first portion encapsulant film and second portion encapsulant located between the semiconductor chip and the substrate;

reflowing the solder bumps in order to attach the semiconductor chip to the substrate; and

curing the first portion encapsulant film and the second portion encapsulant;

wherein said first portion encapsulant film comprises a chemical composition ~~selected so~~ as configured sufficiently to not adversely affect properties of the second portion encapsulant, said properties including

- i. a fluxing agent promoting wetting of the metallized substrate by the solder;
- ii. chemically immobilizing the fluxing agent and flux reaction byproducts after cure;
- iii. having a low viscosity during a soldering operation that does not impede flow of molten solder;
- iv. resisting corrosion and resisting degradation at soldering temperatures; and
- v. not evolving any gases that can cause voids or bubbles.

22. (Currently amended) A method for making an electrical component assembly, comprising, in sequence, the steps of:

laminating a film on an active surface of an semiconductor chip having discrete solder bumps thereon;

coating the film with an encapsulant;

placing the semiconductor chip on a substrate with the film and encapsulant located between the semiconductor chip and the substrate;

reflowing the solder bumps in order to attach the semiconductor chip to the substrate; and
curing the encapsulant;

wherein said film comprises a chemical composition ~~selected so as~~ configured
sufficiently to not adversely affect properties of said encapsulant, said properties including

- i. a fluxing agent promoting wetting of the metallized substrate by the solder;
- ii. chemically immobilizing the fluxing agent and flux reaction byproducts after cure;
- iii. having a low viscosity during a soldering operation that does not impede flow of molten solder;
- iv. resisting corrosion and resisting degradation at soldering temperatures; and
- v. not evolving any gases that can cause voids or bubbles.

23. (Withdrawn) A method for making an electrical component assembly comprising the steps of:

providing a printed circuit substrate having one or more discrete metallized pads thereon;
providing a semiconductor chip device having an active surface with a plurality of solderable contact pads thereon, at least one solderable contact pad corresponding to at least one metallized pad on the printed circuit substrate;

applying to one of at least a portion of the printed circuit substrate surface or at least a portion of the active surface of the semiconductor chip a first portion encapsulant;

producing holes in the encapsulant to expose the metallized pads on the substrate;

filling said holes with solder;

disposing a second portion encapsulant comprising a fluxing agent between the semiconductor chip device and the printed circuit substrate;

attaching the semiconductor chip device to the printed circuit substrate to form a combined unit wherein the solder-filled holes face towards and are aligned with their corresponding solderable pads on the semiconductor chip device and there exists a thin layer of

said second portion encapsulant at least between the solder-filled holes and the semiconductor chip device;

wherein said first portion encapsulant comprises a chemical composition selected so as to not adversely affect properties of the second portion, said properties including:

- a fluxing agent promoting wetting of the solderable contact pads by the solder;
- chemically immobilizing the fluxing agent and flux reaction byproducts after cure;
- having a low viscosity during a soldering operation that does not impede flow of molten solder;
- resisting corrosion and resisting degradation at soldering temperatures; and
- not evolving any gases that can cause voids or bubbles.

24. (Withdrawn) The method of claim 23 further comprising heating the combined unit up to a temperature that melts the solder and simultaneously softens at least the second portion encapsulant to a low viscosity, maintaining at least the second portion encapsulant at the low viscosity while the solder wets the solderable contact pads.

25. (Withdrawn) The method of claim 24 further comprising allowing the melted solder and encapsulant materials to harden.

26. (Withdrawn) The method of claim 23 wherein at least the first portion encapsulant comprises a laminated film.

27. (Withdrawn) The method of claim 23 wherein the holes are filled with solder so that the solder protrudes beyond the surface of the first portion encapsulant.

28. (Withdrawn) The method of claim 23 wherein the second portion encapsulant is applied to the printed circuit substrate and first portion encapsulant.

29. (Withdrawn) The method of claim 23 wherein the second portion encapsulant is applied to the semiconductor chip device.

30. (Withdrawn) The method of claim 23 wherein the first portion encapsulant comprises a polymer having a filler.

31. (Withdrawn) A method for making an electrical component assembly comprising the steps of:

providing a printed circuit substrate having one or more discrete metallized pads thereon with a plurality of discrete solder bumps such that said one or more metallized pads has a solder bump associated therewith and electrically interconnected thereto;

providing a semiconductor chip device having an active surface with a plurality of solderable contact pads thereon, at least one solderable contact pad corresponding to at least one metallized pad on the printed circuit substrate;

applying to one of at least a portion of the printed circuit substrate surface or at least a portion of the active surface of the semiconductor chip a first portion encapsulant;

producing holes in the encapsulant to expose the solder bumps on the substrate;

disposing a second portion encapsulant comprising a fluxing agent between the semiconductor chip device and the printed circuit substrate;

attaching the semiconductor chip device to the printed circuit substrate to form a combined unit wherein the solder bumps face towards and are aligned with their corresponding solderable pads on the semiconductor chip device and there exists a thin layer of said second portion encapsulant at least between the solder bumps and the semiconductor chip device;

wherein said first portion encapsulant comprises a chemical composition selected so as to not adversely affect properties of the second portion, said properties including:

- a fluxing agent promoting wetting of the solderable contact pads by the solder;
- chemically immobilizing the fluxing agent and flux reaction byproducts after cure;
- having a low viscosity during a soldering operation that does not impede flow of molten solder;
- resisting corrosion and resisting degradation at soldering temperatures; and
- not evolving any gases that can cause voids or bubbles.

32. (Withdrawn) The method of claim 31 further comprising heating the combined unit up to a temperature that melts the solder and simultaneously softens at least the second portion encapsulant to a low viscosity, maintaining at least the second portion encapsulant at the low viscosity while the solder wets the solderable contact pads.

33. (Withdrawn) The method of claim 32 further comprising allowing the melted solder and encapsulant materials to harden.

34. (Withdrawn) The method of claim 31 wherein at least the first portion encapsulant comprises a laminated film.

35. (Withdrawn) The method of claim 31 wherein the solder bumps protrude beyond the surface of the first portion encapsulant.

36. (Withdrawn) The method of claim 31 wherein the second portion encapsulant is applied to the printed circuit substrate and first portion encapsulant.

37. (Withdrawn) The method of claim 31 wherein the second portion encapsulant is applied to the semiconductor chip device.

38. (Withdrawn) The method of claim 31 wherein the first portion encapsulant comprises a polymer having a filler.